AMENDMENTS TO THE CLAIMS

The following claim listing replaces all prior listings and versions thereof.

1. (Original) An optical element retracting mechanism for a retractable lens including an optical system having a plurality of optical elements, said optical element retracting mechanism comprising:

a linearly movable ring configured to be guided along an optical axis of said optical system without rotating, said linearly movable ring further configured to retract toward a plane along said optical axis when said retractable lens moves from an operational state to a fully-retracted state;

a swingable holder pivoted on a pivot to be swingable about said pivot, said swingable holder positioned inside and supported by said linearly movable ring, said swingable holder supporting a retractable optical element as one of said plurality of optical elements;

a position-controller configured to hold said swingable holder such that said retractable optical element remains on said optical axis when said retractable lens is in said operational state, said position-controller further configured to rotate said swingable holder about said pivot such that said retractable optical element retracts to a position which deviates from said optical axis when said linearly movable ring, together with said swingable holder, retracts toward said plane;

an internal optical element positioned inside said linearly movable ring on one of opposite sides of said retractable optical element, in said optical axis direction;

a pair of parallel flat surfaces located on said linearly movable ring, each extending in a direction generally orthogonal to said optical axis and respectively positioned on front and rear sides of said internal optical element in said optical axis direction, said pair of parallel flat surfaces not

overlapping said second optical element in said optical axis direction;

a through hole formed on said linearly movable ring which penetrates through said linearly movable ring such that front and rear ends of said through hole are respectively open at said pair of parallel flat surfaces in said optical axis direction, said pivot being positioned in said through hole; and

a pair of support plates respectively attached to said pair of parallel flat surfaces to support opposite ends of said pivot.

2. (Original) The optical element retracting mechanism according to claim 1, wherein said pivot extends generally parallel to said optical axis.

3. (Original) The optical element retracting mechanism according to claim 1, wherein at least one of said pair of parallel flat surfaces is substantially flush with one of a front end surface and a rear end surface of said linearly movable ring.

4. (Original) The optical element retracting mechanism according to claim 1, wherein one of said pair of support plates comprises a screw hole and the other of said pair of support plates comprises a screw insertion hole such that said pair of support plates are fixed to said pair of parallel flat surfaces by a common set screw inserted into said screw insertion hole and screwed through said screw holes.

5. (Original) The optical element retracting mechanism according to claim 1, wherein said linearly movable ring comprises a pair of positioning projections located on said pair of parallel flat surfaces, respectively, and

wherein said pair of support plates comprise a pair of positioning holes into which said pair

of positioning projections are inserted, respectively.

6. (Original) The optical element retracting mechanism according to claim 1, wherein said swingable holder comprises a pivoted cylindrical portion fitted on said pivot to be rotatable on said pivot, said pivoted cylindrical portion positioned in said through hole together with said pivot, and wherein said pivoted cylindrical portion is between said pair of support plates.

7. (Original) The optical element retracting mechanism according to claim 6, further comprising a compression coil spring fitted on said pivot, said compression coil spring configured to bias said swingable holder in said optical axis direction such that one end of said pivoted cylindrical portion is pressed against one of said pair of support plates.

8. (Original) The optical element retracting mechanism according to claim 1, wherein said pair of support plates is configured to be moved on said pair of parallel flat surfaces such that positions of said pair of support plates relative to said pair of parallel flat surfaces are adjustable in directions substantially orthogonal to said optical axis, respectively.

9. (Original) The optical element retracting mechanism according to claim 1, wherein said internal optical element comprises at least one of a shutter and a diaphragm.

10. (Original) The optical element retracting mechanism according to claim 1, wherein said optical elements comprise at least one rear optical element positioned behind said retractable optical element when said retractable lens is in said operational state; and

wherein said retractable optical element is configured to be positioned in an off-axis space radially outside an on-axis space in which said rear optical element is positioned, such that said retractable optical element and said rear optical element are in generally a same positional range in

the optical axis direction, when said retractable lens is in said fully-retracted state.

11. (Original) The optical element retracting mechanism according to claim 1, wherein said retractable optical element comprises a lens group.

12. (Original) The optical element retracting mechanism according to claim 1, wherein said optical system comprises a zoom photographing optical system; and

wherein said retractable optical element comprises a lens group as a part of said zoom photographing optical system.

13. (Original) The optical element retracting mechanism according to claim 1, wherein said optical element retracting mechanism is incorporated in a digital camera.

14. (Original) optical element retracting mechanism according to claim 1, said position-controller comprises:

a spring configured to bias said swingable holder to rotate in a direction to position said retractable optical element on said optical axis; and

a cam configured to rotate said swingable holder to said deviated position from said optical axis, against the biasing force of said spring, when said linearly movable ring, together with said swingable holder, retracts toward said plane.

15. (Original) An optical element retracting mechanism for a retractable lens including an optical system having a plurality of optical elements, said optical element retracting mechanism comprising:

a linearly movable ring configured to be guided along an optical axis of said optical system without rotating, said linearly movable ring further configured to retract toward a plane along said

optical axis when said retractable lens moves from an operational state to a fully-retracted state;

a swingable holder pivoted on a pivot to be swingable about said pivot, said swingable holder positioned inside and supported by said linearly movable ring, said swingable holder supporting a retractable optical element as one of said plurality of optical elements;

a position-controller configured to hold said swingable holder such that said retractable optical element remains on said optical axis when said retractable lens is in said operational state, said position-controller configured to rotate said swingable holder about said pivot such that said retractable optical element retracts to a position which deviates from said optical axis when said linearly movable ring, together with said swingable holder, retracts toward said plane; and

a pair of support plates attached to opposite ends of said linearly movable ring in said optical axis direction, each plate of said pair of support plates supporting a respective opposite end of said pivot.

16. (Original) The optical element retracting mechanism according to claim 15, wherein said pivot extends substantially parallel to said optical axis.

17. (Original) The optical element retracting mechanism according to claim 15, wherein a range of movement of said retractable optical element in an internal space of said linearly movable ring does not overlap a pair of attaching areas on said linearly movable ring in said optical axis direction, said pair of support plates being attached to said pair of attaching areas, respectively.

18. (New) A digital camera having a body and a retractable lens having an optical system having a plurality of optical elements, the retractable lens housed within the body and having an optical element retracting mechanism, the optical element retracting mechanism comprising:

a linearly movable ring configured to be guided along an optical axis of said optical system, said linearly movable ring further configured to retract toward a plane along said optical axis when said retractable lens moves from an operational state to a retracted state;

a swingable holder pivoted on a pivot to be swingable about said pivot, said swingable holder positioned inside and supported by said linearly movable ring, said swingable holder supporting a retractable optical element as one of said plurality of optical elements;

a position-controller configured to hold said swingable holder such that said retractable optical element remains on said optical axis when said retractable lens is in said operational state, said position-controller further configured to rotate said swingable holder about said pivot such that said retractable optical element retracts to a position which deviates from said optical axis when said linearly movable ring, together with said swingable holder, retracts toward said plane;

an internal optical element positioned inside said linearly movable ring on one of opposite sides of said retractable optical element, in said optical axis direction;

a pair of parallel flat surfaces located on said linearly movable ring, each extending in a direction generally orthogonal to said optical axis and respectively positioned on front and rear sides of said internal optical element in said optical axis direction, said pair of parallel flat surfaces not overlapping said second optical element in said optical axis direction;

a through hole formed on said linearly movable ring which penetrates through said linearly movable ring such that front and rear ends of said through hole are respectively open at said pair of parallel flat surfaces in said optical axis direction, said pivot being positioned in said through hole; and

a pair of support plates respectively attached to said pair of parallel flat surfaces to support opposite ends of said pivot.

19. (New) The camera according to claim 18, wherein said pivot extends generally parallel to said optical axis.

20. (New) The camera according to claim 18, wherein at least one of said pair of parallel flat surfaces is substantially flush with one of a front end surface and a rear end surface of said linearly movable ring.

21. (New) The camera according to claim 18, wherein one of said pair of support plates comprises a screw hole and the other of said pair of support plates comprises a screw insertion hole such that said pair of support plates are fixed to said pair of parallel flat surfaces by a common set screw inserted into said screw insertion hole and screwed through said screw holes.

22. (New) The camera according to claim 18, wherein said linearly movable ring comprises a pair of positioning projections located on said pair of parallel flat surfaces, respectively, and

wherein said pair of support plates comprise a pair of positioning holes into which said pair of positioning projections are inserted, respectively.

23. (New) The camera according to claim 18, wherein said swingable holder comprises a pivoted cylindrical portion fitted on said pivot to be rotatable on said pivot, said pivoted cylindrical portion positioned in said through hole together with said pivot, and wherein said pivoted cylindrical portion is between said pair of support plates.

24. (New) The camera according to claim 18, wherein said pair of support plates is configured to be moved on said pair of parallel flat surfaces such that positions of said pair of

support plates relative to said pair of parallel flat surfaces are adjustable in directions substantially orthogonal to said optical axis, respectively.

25. (New) The camera according to claim 18, wherein said internal optical element comprises at least one of a shutter and a diaphragm.

26. (New) The camera according to claim 18, wherein said optical elements comprise at least one rear optical element positioned behind said retractable optical element when said retractable lens is in said operational state; and

wherein said retractable optical element is configured to be positioned in an off-axis space radially outside an on-axis space in which said rear optical element is positioned, such that said retractable optical element and said rear optical element are in generally a same positional range in the optical axis direction, when said retractable lens is in said retracted state.

27. (New) The camera according to claim 18, wherein said retractable optical element comprises a lens group.

28. (New) The camera according to claim 18, wherein said optical system comprises a zoom photographing optical system; and

wherein said retractable optical element comprises a lens group as a part of said zoom photographing optical system.

29. (New) The camera according to claim 18, said position-controller comprises:

a spring configured to bias said swingable holder to rotate in a direction to position said retractable optical element on said optical axis; and

a cam configured to rotate said swingable holder to said deviated position from said optical

axis, against the biasing force of said spring, when said linearly movable ring, together with said swingable holder, retracts toward said plane.